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Research Article

Sick Sinus Syndrome (Sinus Node Dysfunction, Bradyarrythmia) Association with COVID-19

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A B S T R A C T

COVID-19 is associated with cardiovascular morbidity and mortality. In this case report, we have demonstrated a case of sinus node dysfunction associated with COVID-19 (clinical features, pathophysiology, andoutcome) as an initial presenting complication without any previous respiratory signs and symptoms.

Keywords: Novel Coronavirus, COVID-19, SARS-CoV-2, IgM, IgG Antibody, Sinus Node Sick Sinus Syndrome

Introduction

Case Presentation

An 80-year-old male with previous H/o DM-2 presented to the emergency department at the hospital with a history suggestive of syncope (sudden onset of loss of consciousness with palpitation) before 4 days. He didn't give any history of respiratory illness in the past three months (no history of cough, chest pain, breathlessness, fever) before admission. On examination at the emergency department, the patient was afebrile with bradycardia, regularly irregular rhythm, and no murmur. On respiratory examination, both lungs wereclear and $SpO_2$was 98% on room air. His HR was 50/minute, chest radiograph was clear, and RTPCR true NAT was negative for COVID-19. However, he was SARS-CoV-2 IgM IgG antibodies positive for COVID-19 suggestingrecent infection. His ECG on admission RBBB pattern with sinus pauses in lead II, deep 'S' wave in V5, V6, RsR[I] in V1 to V4, with left axis deviation, absent P & QRS after every two normal 'P' & QRS suggestive of atrial bigeminy on day 1 (Sick Sinus Syndrome). On day 2, similar changes inatrial bigeminy were observed. Later onday 2, he was put on continuous ECG Holter monitoring for 24 hours, which showed the following: average HR 75/min, minimum HR 52/min, and maximum HR 147/min. HRCT chest revealed no obvious active pleural parenchymal lesionand a CT severity score of 0/25 (Table 1).

Table 1.Holter Report

Parameter	Event
Average HR	75/min
Minimum HR	52
Maximum HR	147
Ventricular ectopic	O
Ventricular bigeminy	9
Ventricular trigeminy	0
Ventricular Quadrigeminy	0
Supraventricular ectopic	682 with 0 SVE RUNS, 1 SVE PAIRS
Supraventricular bigeminy	0
Supraventricular trigeminy	0

Supraventricular Quadrigeminy	0
Total number of PACED beats	0
Total number of pauses With maximum pause	6 3.84 sec
Conclusion: Sick Sinus Syndrome (Tachy-Brady with sinus pause upto 3.8 seconds only)	

The Holter report was as follows

On day 3, he was put on a dual-chamber permanent pacemaker (PPI) for sick sinus syndrome.

2 D Echo revealedmild concentric LVH, RA RV mildly dilated, grade I diastolic dysfunction, mild MR, mild TR, mild PAH, and no intracardiac clot or vegetation.

Discussion

As we know, sick sinus syndrome or sinus node dysfunction may have SB/SA/AEB/CI/BTS as one of the spectrum of variants. COVID-19 illness may be associated with bradyarrhythmia during the active phase or in the later stage of illness. Here, we have presented a case report of a patient having an initial presentation of sick sinus syndrome without respiratory symptoms involvement of COVID-19 which was demonstrated by SARS-CoV-2 antibody IgM/IgG positive andRTPCR negative on the day of admission.

COVID-19 associated cardiac complications include multiple presentations: Ischemic heart disease (myocardial infarction), myocarditis, tachyarrhythmia, and rarely bradyarrhythmia as presented in our patient. The various aetiologiesfor this pathology suggest most likely a systemic inflammation and further damage to myocardial cells by a virus by the release of cytokines like IL-6and TNF-α. Afew studies showthat there might be alteration in the autonomic nervous system including the intrinsic cardiac nervous system causingsinus node dysfunction (sick sinus syndrome).

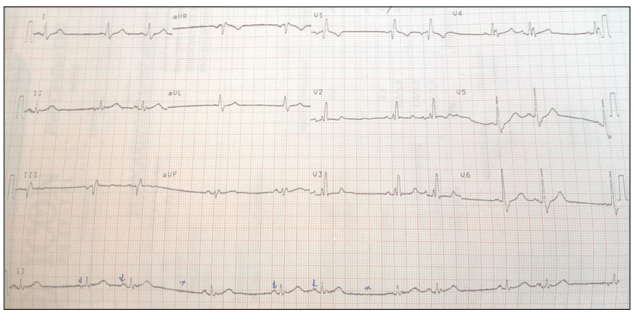

Figure 1.ECG on Presentation: RBBB Pattern with Occasional APC with Sick Sinus Syndrome

It may be secondary to the invasion of a virus in the nervous system of heart or vagal mediated onset of disease. This helps determine a high correlation between acute or later stages of COVID-19 viral illness and bradyarrhythmia. We treated the patient with dual-chamber permanent pacemaker implantation onday 3 of admission after his Holter monitoring (Figure 1 to 4).

Figure 2.ECG 2RBBB Pattern with Occasional APC

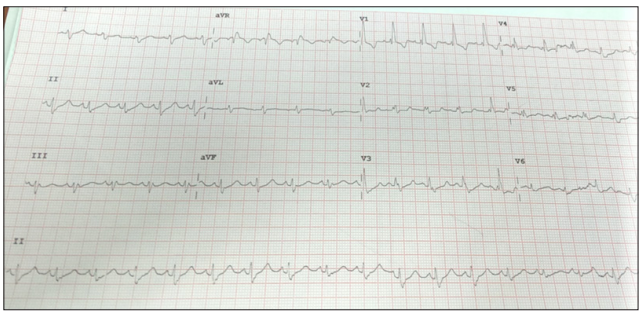

Figure 3.ECG 3: Post PPI

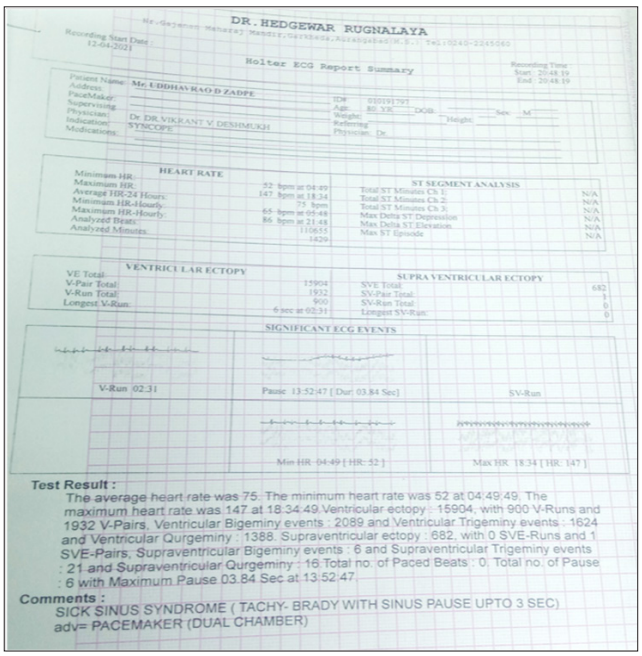

Figure 4.Holter Continuous Cardiac Monitoring Report: Suggestive of Sick Sinus syndrome

Table 2.Investigation Profile

COVID Profile			Routine Profile		
Parameter	**Value**	**Reference range**	**Parameter**	**Value**	**Reference range**
CRP	2.52	0.0-5.0	RBS	184.4	70-140
D Dimer	1.22	0.0-0.5	Sodium	138	135-138
Ferettine	36	23.9-336.2	Potassium	4.27	3.5-4.5
LDH	195	142-270	Urea	36	17-43
PT	13.8	11-16	Creatinine	1.06	0.72-1.18
INR	1.06	0.8-1.2	WBC	9400	4000-10000
IgM SARS-CoV-2 antibody	Reactive 3.46	> 1.0 for reactive	HB	13.9	13-17
IgG SARS-CoV-2 antibody	Reactive 52.08	> 1.0 for reactive	MCV	88.7	83-11
RTPCR True NAT SARS-CoV-2	Negative	E gene not detected Orfla gene not detected	Platelet	103	150-410
HS Trop I	7.8	Less than 17.9 pgml	N	74.9%	40-80
TSH	0.56	0.35-4.95	L	18.6	20-40
HIV HBSAG HCV	Non-reactive		E	0.5	1.0-6.0

Important Pearls to Learn

- Sinus node dysfunction may be a presenting feature of COVID-19 illness pathology without respiratory involvement in affected patients
- It may be due to inflammation of sinus node and conduction system and direct inflammation of sinus of heart
- An evaluation of rhythm abnormalities should be done in all symptomatic patients ofCOVID-19 illness (Table 2)

Conclusion

It is the need of time to timely and closely monitor COVID-19 for bradyarrhythmia in acute or later stages of illness. More studies assessing long-term prognosis andoutcome in patients with sick sinus syndrome associated with COVID-19 should be conducted for better understanding.

Conflict of Interest: None

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